DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of invention I claims 1-5 and 15-23 in the reply filed on April 4, 2008 is acknowledged.

2. Claims 6-14 and 24-27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 2, 2008.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Wester (US 6362513).

Re claim 1: Wester teaches an optical device (abstract), comprising: a substrate having a plurality of channels there-through (see fig. 2); a plurality of shutters, with respective shutters associated with respective channels in the substrate (col. 5, lines 5-8, the term signals is sufficient to say a plurality of shutters for each photocell); and a plurality of lenses (228), each lens having a body portion and a head portion (see fig. 2),

with respective body portions of the lenses disposed in respective channels of the substrate (see fig. 2).

Re claim 2: Wester teaches the optical device, wherein the plurality of lenses comprise a polymer material (col. 3, lines 56-59).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wester (US 6362513) in view of Uchida (US 6583438).

Re claim 3: Wester teaches plurality of lenses (228) (fig. 2) comprise a polymer (col. 3, lines 56-59). Wester does not teach the optical device, wherein the plurality of lenses comprise an oxide film material. Uchida teaches an optical device (abstract), wherein the plurality of lenses comprise an oxide film material (3, fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the silicon oxide film material lens of Uchida with the lens of Wester to provide a high index of refraction to direct a light beam in a certain direction.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wester (US 6362513) in view of Kimura (US 6259083).

Re claim 4: Wester teaches plurality of lenses (228) (fig. 2) comprise a polymer (col. 3, lines 56-59). Wester does not teach the optical device, wherein the plurality of lenses comprise an nitride film material. Kimura teaches an optical device (abstract), wherein the plurality of lenses comprise an nitride film material (col. 3, lines 38-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the silicon nitride lens of Kimura with the lens of Wester to provide a high index of refraction to direct a light beam in a certain direction.

Re claim 5: Wester teaches an optical device (fig. 2), comprising a substrate with a plurality of lenses (228) directing light to a photodiode (204). Wester does not teach the optical device, the substrate having a first refractive index and the plurality of lenses having a second refractive index, wherein the first refractive index is less than the second refractive index. Kimura teaches a optical device (abstract), comprising a substrate (1-7) and a microlens (8-11), wherein the substrate having a first refractive index and the plurality of lenses having a second refractive index, wherein the first refractive index is less than the second refractive index (col. 3, lines 38-47). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the different refraction indexes of Kimura with the substrate and lens of Wester in order to direct the light beams in a certain direction specifically toward the photodiode.

8. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wester (US 6362513) in view of Shimoyama et al. (US 2002/0080096).

Re claim 15: Wester teaches an optical device (fig. 2) a microlens array (228), comprising a plurality of microlenses (see fig. 2), wherein each microlens comprises a head portion (the mushroom top) and a body portion (the portion within the channel, see fig. 2), the head portion being convex (mushroom top, see fig. 2) and the body portion having the predetermined shape (rectangular), the microlens array (228) being self-aligned with the photodiode (204); wherein the body portion (rectangular portion) of each microlens of the plurality of microlenses (228) fits into one of the plurality of channels and the head portion (mushroom portion) of each microlens of the plurality of microlenses extends outside a second end of the substrate (see fig. 2). Wester does not teach a diffraction grating, comprising a plurality of channels disposed within a substrate, the channels having a predetermined shape; and the microlens array being self-aligned with the diffraction grating. Shimoyama teaches an optical device (fig. 4) a diffraction grating (91) (see Paragraph 0061), comprising a plurality of channels (the slits) disposed within a substrate (see fig. 4), the channels having a predetermined shape (rectangular); and the microlens array (100) being self-aligned with the diffraction grating (see fig. 4). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to place a grating of Shimoyama in the optical device of Wester to have an optical device with a larger view range in order to display a three-dimensional object with higher clarity.

Re claim 16: Wester as modified by Shimoyama teaches the optical device (Shimoyama, fig. 4), wherein the head portion of a first microlens (100-1) touches the head portion of an adjacent microlens (100-2).

Re claim 17: Wester as modified by Shimoyama teaches the optical device (Wester, fig. 2) , wherein the microlens array comprises a polymer material (col. 3, lines 56-59).

9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wester (US 6362513) as modified by Shimoyama et al. (US 2002/0080096) as applied to claim 16 above, and further in view of Uchida (US 6583438).

Re claim 18: Wester as modified by Shimoyama teaches plurality of lenses (228) (Wester, fig. 2) comprise a polymer (Wester, col. 3, lines 56-59). Wester as modified by Shimoyama does not teach the optical device, wherein the plurality of lenses comprise an oxide film material. Uchida teaches an optical device (abstract), wherein the plurality of lenses comprise an oxide film material (3, fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the silicon oxide film material lens of Uchida with the lens of Wester as modified by Shimoyama to provide a high index of refraction to direct a light beam in a certain direction.

10. Claims 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wester (US 6362513) as modified by Shimoyama et al. (US 2002/0080096) as applied to claim 16 above, and further in view of Kimura (US 6259083).

Re claim 19: Wester as modified by Shimoyama teaches plurality of lenses (228) (Wester, fig. 2) comprise a polymer (Wester, col. 3, lines 56-59). Wester as modified by Shimoyama does not teach the optical device, wherein the plurality of lenses comprise an nitride film material. Kimura teaches an optical device (abstract), wherein the plurality of lenses comprise an nitride film material (col. 3, lines 38-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the silicon nitride lens of Kimura with the lens of Wester as modified by Shimoyama to provide a high index of refraction to direct a light beam in a certain direction.

Re claim 20: Wester as modified by Shimoyama teaches an optical device (Wester, fig. 2), comprising a substrate with a plurality of lenses (228) directing light to a photodiode (Wester, 204). Wester does not teach the optical device, the substrate having a first refractive index and the plurality of lenses having a second refractive index, wherein the first refractive index is less than the second refractive index. Kimura teaches a optical device (abstract), comprising a substrate (1-7) and a microlens (8-11), wherein the substrate having a first refractive index and the plurality of lenses having a second refractive index, wherein the first refractive index is less than the second refractive index (col. 3, lines 38-47). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the different refraction indexes of

Kimura with the substrate and lens of Wester as modified by Shimoyama in order to direct the light beams in a certain direction specifically toward the photodiode.

Re claim 21: Wester as modified by Shimoyama and Kimura teach the optical device (Shimoyama, fig. 4 and Kimura, fig. 4), further comprising: a light source for sending light rays (Shimoyama, 81-85) toward the diffraction grating (91) (Shimoyama, fig. 5), to be received by the head portion of each microlens (Shimoyama, fig. 4, Kimura, 8-11). Wester as modified by Shimoyama does not the light rays comprising first light rays, second light rays, and third light rays; wherein the first light rays travel within the channel boundary and are received into the channel and the second light rays travel within the active pixel region, but outside the channel boundary, and are refracted by the microlens and received into the channel. Kimura teaches an optical device comprising: a light source for sending light rays (abstract, incident light means there is a light source producing the incident light) to be received by the head portion of each microlens (see fig. 4), the light rays comprising first light rays (Kimura, L1), second light rays (Kimura, L2), and third light rays (Kimura, L3); wherein the first light rays (Kimura, L1) travel within the channel boundary and are received into the channel (Kimura, see fig. 4) and the second light rays (Kimura, L2) travel within the active pixel region (Kimura, within 2 the pixel region, see fig. 4), but outside the channel boundary, and are refracted by the microlens and received into the channel (,Kimura, L2 is refracted by the microlens into the region). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the light source and rays in Kimura with the optical device in Wester as modified by Shimoyama in order to have an optical device

that is able to direct all the rays in a certain direction so that all light that can be applied to form an accurate image.

Re claim 22: Wester as modified by Shimoyama and Kimura teaches the optical device (Kimura, fig. 4), wherein the third light rays (L3) travel outside the active pixel region, are refracted by the microlens, but are reflected off the substrate as fourth light rays (L3 reflected off of 7 to create a L4 beam).

Re claim 23: Wester as modified by Shimoyama and Kimura teaches the optical device (Kimura, fig. 4), wherein some of the fourth light rays are reflected by the microlens back into the channel according to the principle of total internal reflection (follow L3 ends back in the channel, see fig. 4).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER BENNETT whose telephone number is (571)270-3419. The examiner can normally be reached on Monday - Friday 0730 - 1700 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. B./

/Georgia Y Epps/

Supervisory Patent Examiner, Art Unit 2878